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09/693,157	10/20/2000	Jang-Ho Cho	SAM-162	8192

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EXAMINER

GERSTL, SHANE F

ART UNIT	PAPER NUMBER
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2183

DATE MAILED: 05/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/693,157

Applicant(s)

CHO, JANG-HO

Examiner

Shane F Gerstl

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 01 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 October 2000 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: \_\_\_\_\_

### DETAILED ACTION

1. Claims 1-8 have been examined.

#### ***Papers Received***

2. Receipt is acknowledged of extension of time, amendment, priority, and declaration papers submitted, where the papers have been placed of record in the file.
3. The specification objections, claim objections, and Examiner's drawing objection set forth in the action mailed 01 March 2004 have all been overcome by the filed amendment and are thus withdrawn.

#### ***Response to Amendment***

4. The declaration filed on 01 March 2004 under 37 CFR 1.131 has been considered but is ineffective to overcome the Manne and Hennessy references.
5. The Manne and Hennessy references are statutory bars under 35 U.S.C. 102(b) and thus cannot be overcome by an affidavit or declaration under 37 CFR 1.131.
6. MPEP section 715 states:  
*"An affidavit or declaration under 37 CFR 1.131 is not appropriate in the following situations:*  
*"(A) Where the reference publication date is more than 1 year prior to applicant's or patent owner's effective filing date. Such a reference is a "statutory bar" under 35 U.S.C. 102(b) as referenced in 37 CFR 1.131(a)(2)."*
7. One will notice from the following citation of 35 USC 102 (b) that a reference qualifying as a "statutory bar" is one that is published more than 1 year from the *United States* filing date:

*"(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States."*

**Drawings**

8. The objections to the drawings set forth by the draftsman under 37 CFR 1.84(g) in the Action mailed 27 August 2003 have not been responded to by the Applicant. Appropriate correction is required in response to the application to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

**Claim Rejections - 35 USC § 103**

9. The art rejections set forth in the previous Office Action are still in effect and reproduced below for Applicant's convenience.

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Manne in view of Hennessy. Manne's Paper "Branch Prediction using Selective Branch Inversion," (International Conference on Parallel Architectures and Compilation Techniques, 1999) describes how accuracy history can be combined with multiple branch prediction schemes.

12. In regard to claim 1:

- a. Manne teaches a branch predictor (SBI Predictor) as seen in Figure 1. Note Manne's branch prediction means for predicting a conditional branch of a branch instruction (Figure 1, Branch Predictor). Refer to section 2.2, paragraph 1, lines 16-18 where Manne discloses a branch being correctly predicted. A comparator would have been used to determine if the branch was correctly predicted. This makes a comparator for generating a comparison signal by comparing the predicted conditional branch from the branch prediction means with a real conditional branch of the branch instruction inherent. Manne also discloses an accuracy history table (confidence estimator of Figure 1) for storing an accuracy history of the predicted conditional branch. Note Manne's use of a first state transition logic circuit (section 4.1, paragraph 2, one-bit resetting counter) for generating an accuracy history bit to be stored in the accuracy history table in response to the comparison signal.
- b. Manne lacks the explicit use of a multiplexer for outputting an alternative one of the conditional branch and an inverted conditional branch as a final branch prediction outcome, in response to a predicted accuracy history signal based on the accuracy history bit.
- c. However, Manne does teach that the branch prediction is inverted for all low-confidence branches. Therefore, the Selective Branch Inversion predictor (Manne, Figure 1) would output either the conditional branch from the branch predictor or an inverted conditional branch from the branch predictor as a final branch prediction result.

- d. As demonstrated by Hennessy on page 351, a multiplexer is usually used in a system to select among inputs to share a data path because of its simplicity of design and integration. This simplicity leads to low cost and good performance. The simplistic design and integration would have motivated one with ordinary skill in the art at the time of invention to use a multiplexer in Manne's proposal for outputting an alternative one of the conditional branch and an inverted conditional branch as a final prediction output.

It would have been obvious to one with ordinary skill in the art at the time of invention to use a multiplexer to select the correct data for the final branch prediction outcome so that the integration of the system is simple and efficient.

13. In regard to claim 2, note that the Gshare predictor of Figure 2a can be used as the branch predictor portion of Figure 1. Manne discloses the use of a branch history register for storing the outcome of previous branch instructions as described in section 2.1, paragraph 2. The two-bit counter scheme, a standard in the Gshare predictor, of section 2.1, paragraph 2 serves as a second state transition logic circuit for generating the pattern history bits in response to the real conditional branch of the branch instruction. Also note, Manne's use of a pattern history table (Figure 2a) for storing pattern history bits used for generating the predicted conditional branch corresponding to the conditional branches of the previous branch instructions stored in the branch history register in this embodiment.

14. In regard to claim 3, notice Manne's use of a two-bit counter on paragraph 4 of section 4.1 that is included in the second state transitional logic of the standard Gshare

algorithm. This counter is by nature up/down counting so the pattern history can change based on both a taken and not-taken branch. The counter in this algorithm is also of the saturating type so that a counter of the strong taken state does not roll over to the strong not-taken state because of another taken branch.

15. In regard to claim 4, note Manne's use of an accuracy history table as explained previously. This table keeps track of, or stores, a number of correct predictions. This in itself defines memory since it is holding data for later retrieval. This accuracy history table also is an arrangement of such elements, or an array. Thus Manne's accuracy history table does include a memory array.

16. In regard to claim 5, the saturating counter of the above argument requires a different value to be received from the inherent comparator discussed above for a correct prediction than an incorrect prediction. A '1' will increase the count by one and a '0' decrease it, or visa versa. If a different value is not given for correct or incorrect, the counter will eventually be stuck at either the upper or lower extremities with no way to count in the other direction.

17. In regard to claim 6, Manne keeps a count of correct predictions in his accuracy history table using a first state logic circuit that includes a saturated up/down counter (paragraph 4 of section 4.1).

18. In regard to claim 7, this first state logic counter will be used after learning the accuracy of past pattern predictions since the comparator output is the activating signal and it determines if the past predictions were correct or not.

19. In regard to claim 8, since the accuracy history bit is only one bit, the most significant bit thereof is one and the same with it. Therefore the predicted accuracy signal, which is determined by the accuracy history bit will also be determined by the most significant bit of the accuracy history bit.

### ***Response to Arguments***

20. Applicant's arguments filed 01 March 2004 have been fully considered but they are not persuasive. The declaration filed under 37 CFR 1.131 is ineffective as shown above and no arguments regarding the art have been entered on the record.

### ***Conclusion***

21. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

22. The following is text cited from 37 CFR 1.111(c): In amending in reply to a rejection of claims in an application or patent under reexamination, the applicant or patent owner must clearly point out the patentable novelty which he or she thinks the

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claims present in view of the state of the art disclosed by the references cited or the objections made. The applicant or patent owner must also show how the amendments avoid such references or objections.

23. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art cited in the previous Office Action remains pertinent and is cited herein with this Action as well.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shane F Gerstl whose telephone number is (703)305-7305. The examiner can normally be reached on M-F 6:45-4:15 (First Friday Off).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan can be reached on (703)305-9712. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Shane F Gerstl  
Examiner  
Art Unit 2183

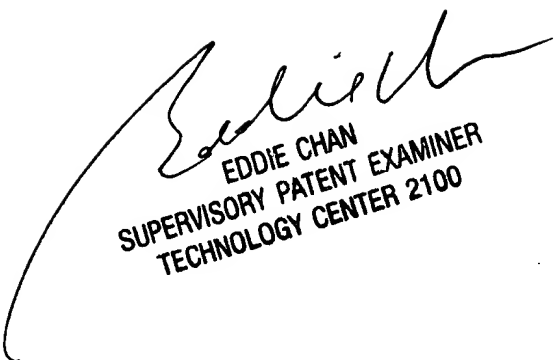
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May 3, 2004



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